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STATE OF ILLINOIS)
COUNTY OF LAKE) SS

COUNTY BOARD, LAKE COUNTY, ILLINOIS
ADJOURNED REGULAR JUNE, A.D., 2008 SESSION
AUGUST 12, A.D., 2008

MADAM CHAIRMAN AND MEMBERS OF THE COUNTY BOARD:

Your Public Works and Transportation and Financial and Administrative Committees present herewith a Joint Resolution authorizing the purchasing agent to enter into an agreement for professional services with the Illinois State Geological Survey to complete detailed 3-D digital geologic mapping for the Lake County Water Supply Planning project, and approve a line item transfers in the amount of ~~\$240,000~~ from the general operating expense accounts to the Water Supply Planning account; and request its adoption.

~~\$~~ 160,000 AM

Respectfully submitted,

	Aye	Nay		Aye	Nay
<u>[Signature]</u> Chairman	✓		<u>[Signature]</u> Chairman	X	
<u>[Signature]</u> Vice-Chairman	✓		<u>[Signature]</u> Vice-Chairman	✓	
<u>Ann B. Marino</u>	✓		<u>[Signature]</u>	✓	
<u>Teresa Douglas</u>	✓		<u>Cassie Calabrese</u>	✓	
<u>Michael A. Calvert</u>	✓		<u>Arnos O'Kelly</u>	✓	
<u>[Signature]</u>	✓				
<u>Law & Judicial Committee</u>			<u>[Signature]</u> Financial & Administrative Committee		
Public Works committee					

RESOLUTION

WHEREAS, the Lake County Board selected Water Supply Planning as one of their top four Strategic Initiatives for 2008; and

WHEREAS, in response to the Board's direction a multi-agency team, the Integrated Water Resources Group (IWRG), was formed to begin work on water supply planning in Lake County; and

WHEREAS, the committee hosted two Lake County Water Forums and developed a report outlining what is know and unknown about the State of Lake County Water Supply; and

WHEREAS, the survey results and input from the two Lake County Water Supply Forums both indicated that Lake County water supply stakeholders seek leadership from the County in two areas including researching and coordinating leading practices in water conservation and further study county geology and water supply; and

WHEREAS, the IWRG team has identified FY2008 monies to be repurposed to fund the first phase of the proposal from the Illinois State Geologic Survey; and

WHEREAS, through the Central Great Lakes Geologic Mapping Coalition and the STATEMAP component of the National Cooperative Geologic Mapping Program, the Illinois State Geologic Survey (ISGS) has been partnering with the United States Geologic Survey (USGS) for more than 16 years to conduct a pilot project to map Lake County geology; and

WHEREAS, this mapping effort has focused on the collection of high-quality data from outcrops, drilling and geophysics with the integration of state of the art computerized mapping software and methods, to create detailed 3-D geologic maps of the glacial deposits and the bedrock surface; and

WHEREAS, the federal and state funding for this project has slowed significantly limiting the progress on the completion of these maps and in response the IWRG has worked with the ISGS to develop a draft two phase concept proposal for the completion of the 3-D digital geologic mapping, phase one of the ISGS proposal will speed the completion of the detailed geologic mapping for Lake County as well as the necessary data points to use for a future water supply modeling project; and

WHEREAS, the proposed project will further the Lake County Water Supply Planning initiative and will acquire the data and information necessary for local government officials and other water stakeholders to make more informed decisions about water supply planning in Lake County.

NOW, THEREFORE, BE IT RESOLVED, by this County Board of Lake County, Illinois, that the purchasing agent be authorized to negotiate and execute an agreement to contract with the Illinois State Geological Survey for professional services to complete detailed geological mapping in the amount not to exceed \$210,000 and

BE IT FURTHER RESOLVED that \$50,000 in funding from the Public Health Department along with line item transfers be authorized in the amount of \$160,000 from the general operating

expense account listed below to the Water Supply Planning account 101-1102065-71150-000-000-000-10110:

Water Supply Project	\$70,000	101-1102040-71150-000-000-000
Public Works	\$50,000	610-4887799-71150-000-000-000
IT/GIS	\$20,000	101-1300050-71730-000-000-000
Planning	\$10,000	101-2800010-71150-000-000-000
SMC	\$10,000	212-4201010-71150-000-000-000

DATED, at Waukegan, Lake County, Illinois, on this 12th day of August, A.D., 2008.

Lake County Water Supply Planning Project

The Lake County Board selected Water Supply Planning as one of their top four Strategic Initiatives for 2008, and in response to the Board's direction, a multi-departmental team, the Integrated Water Resources Group (IWRG) including representation from Public Health, Stormwater Management, Geographic Information Systems, Planning, Public Works, and County Administrator, was formed to begin work on water supply planning in Lake County.

The IWRG drafted a set of initiatives to work on in the near term. One such initiative was to host two Lake County Water Forums out of which two main water stakeholder initiative recommendations were formed.

1. Research and share water conservation leading practices.
2. Study Lake County geology and provide more accurate information about water supply in Lake County.

In response, the IWRG researched existing data resources and developed a report, the State of Lake County Water Supply, which outlines the information that is known as well as the information that is not known about Lake County water supply. The report clearly identified that not enough is known about Lake County's complex glacial geology. The IWRG worked with the ISGS and the ISWS to determine what information is missing and what needs to be done to provide the missing information.

The Illinois State Geologic Survey (ISGS) has been partnering with the United States Geologic Survey (USGS) to complete the mapping of Lake County geology through the collection of high-quality data from outcrops, drilling and geophysics with the integration of state of the art computerized mapping software and methods, to create detailed 3-D geologic maps of the glacial deposits and the bedrock surface. The federal and state funding for this project has slowed significantly limiting the progress on the completion of these maps and the interpretive portion of the geology mapping is not currently funded.

A draft two task concept proposal for the completion of the 3-D digital geologic mapping is presented along with a proposal to repurpose FY2008 monies to fund the first task of the proposal from the Illinois State Geological Survey. The resolution authorizes the purchasing agent to negotiate and execute an agreement to contract with the Illinois State Geological Survey for professional services to complete detailed geological mapping in the amount not to exceed \$210,000.

Funding for this project will be \$50,000 from the FY2008 Health Department Budget along with authorization for line item transfers in the amount of \$160,000 from the general operating expense account listed below to the Water Supply Planning account 101-1102080-71150-000-000-000-10110:

Water Supply Project	\$70,000	101-1102040-71150-000-000-000
Public Works	\$50,000	610-4887799-71150-000-000-000
IT/GIS	\$20,000	101-1300050-71730-000-000-000
Planning	\$10,000	101-2800010-71150-000-000-000
SMC	\$10,000	212-4201010-71150-000-000-000

Strategic Planning Initiatives:
Water Supply Planning

101-1102080-71150-000-000-000-10110

This proposal has three main tasks including

1. Expedite completion of the detailed 3-D geologic maps
2. Create customized hydrologic maps
3. Complete a high resolution water flow modeling

Below the first two tasks are described in greater detail. The results of task 1 will help to mold task three (water flow modeling) and the cost for task three will not be known until after task 1 is complete.

Task 1: Expedite completion of detailed 3-D geologic maps

This project would pay for a dedicated staff member whose expertise was focused on computer mapping techniques. This person would be responsible for generating the digital, high-resolution 3-D geologic maps for Lake County from the interpretations being provided by the ISGS glacial geologists. Staff changes and budget limitations over the past 5 years have resulted in inconsistent availability of highly trained computer mapping technicians to assist ISGS glacial geologists with construction of high resolution 3-D geologic maps in Lake County. Funding this person is expected to speed up completion of the 3-D geologic maps by at least 2 years.

Lake County has very complicated sequences of glacial deposits. The sand and gravel deposits can vary significantly in thickness, composition and occurrence over distances as short as 100 feet. Existing regional geologic maps are not detailed enough to provide accurate predictions of the occurrence of these sand and gravel deposits. The regional maps also provide little to no information on variations in thickness and no information on the composition of these deposits.

The process of high-resolution geologic mapping exposes geologists to far more information than is used for regional or moderate-resolution mapping efforts. The collection and evaluation of these additional data generally result in significant changes to our understanding of how the deposits were formed, where they are distributed and their exact composition. These changes result in much more accurate predictions of the mapped deposits. The data that have been collected and analyzed during the ISGS high-resolution mapping efforts in Lake County have already resulted in significant changes to our understanding of the nature and distribution of this complicated portion of Illinois.

The information from the completion of task 1 can be used for water flow modeling. Water flow modeling helps us understand the condition of the shallow and deep aquifers and how the surface water, recharge areas, and the shallow and deep aquifers inter-relate and interconnect. This will help to create better estimates of the amount and quality of water that maybe available in the aquifer.

How reliable are the results?

Reliable predictions in the occurrence, thickness and composition of sand and gravel deposits are needed to provide accurate predictions of the amount of water within and the flow of water through these sequences of deposits. The error in a given geologic map is heavily dependent upon the complexity and composition of the geologic materials in the map area and upon the amount, distribution and quality of data describing these materials. Maps of more complicated geologic deposits require higher numbers of higher quality data to reduce the uncertainty

significantly. All 3-D geologic maps are generalizations and predictions of the distribution of geologic mapping units at an area. They all will include errors, or uncertainty in predictions, to varying degrees.

The high-resolution maps of glacial deposits being generated by the ISGS mapping program are no exception. This program, however, has been developed to provide the level of accuracy needed for most land use decision support that would be done at a county or municipal level. These maps will not be accurate enough to replace site-specific drilling and characterization that is needed at locations where contamination has or might occur. They will generally be accurate enough, however, to provide insight as to why groundwater contamination may be a concern or how it might progress in a given neighborhood or area of the County.

The reliability of groundwater flow model results are very dependent on the accuracy of the underlying geologic maps. In areas of complicated geology, the reliability of a flow models is more affected by geologic map reliability than in areas of less complicated geology.

Groundwater flow models provide generalized predictions of the rate and direction of groundwater flow through a portion of the earth. Some groundwater flow models require more generalization than others. High resolution geologic maps can be very useful tools, even when they provide more detail than was included in associated groundwater flow models. In these situations, the high-resolution geologic maps can be used to help guide reliable interpretation and application of the results from a more generalized flow model. This can provide a significant reduction in the reliability of decisions made from the groundwater flow modeling predictions. The importance of high-resolution geologic maps will be greater in areas where the geology is very complicated, particularly when this level of complexity is not able to be included in the groundwater flow models.

How will the uncertainty of Federal and State Support for ISGS Initiatives affect this Lake County Project?

The President's currently proposed budget does not contain additional funding for the Great Lakes Geologic Mapping Coalition. ISGS is actively lobbying Congress for support to add this back in, and at a level that would provide more significant assistance. This is the federal program that we have used for match and that is driving our high-resolution 3-D mapping efforts. Decreases in funding will likely cause additional delays in completion of mapping in Lake County.

Currently, funding for the Water Supply Planning program has officially been dropped by the State of Illinois. The effect of this is currently unclear. While this program doesn't directly pay for the high-resolution mapping in Lake County, it does affect other ISGS mappers. This may create personnel changes at the Survey which further disrupt programmatic productivity. If funded, the proposal to Lake County would help ensure stable productivity **by directly funding** a computer mapping technician to enhance ISGS workflow.

Task 2. Create customized hydro geologic maps.

Detailed 3-D geologic maps allow for creation of new maps that are based on interpretations of how the distribution of mapped deposits will affect some specific application. New maps that are generated from interpretations of basic geologic maps are called "interpretive maps." The hydro geologic maps discussed in this task are such interpretive maps.

The complexity of Lake County glacial geology results in localized effects on groundwater flow. This means that the geology will have very localized impacts on land use decisions that might be concerned with protection of shallow groundwater quality, maintenance of groundwater-surface water interactions for wetland ecosystem stability, or protection of recharge to shallow aquifers.

Development of these maps at the ISGS has, historically, been based on very generic assumptions of material properties and groundwater flow. The complexity of deposits in Lake County exacerbates the impact of any simplifying assumptions included in this generic approach and suggests that interpretive maps made from high-resolution geologic maps would benefit from a more customized approach to interpretive map production.

This task would provide a dedicated ISGS staff to work with County and municipal planners, health department workers, water managers, and ISGS geologists responsible for the high-resolution mapping, to create customized interpretive maps for various Lake County needs.

Interactions between shallow groundwater and surface water bodies vary dramatically across the county. This effort would work to develop specific interpretive maps that support decisions relevant to different regions throughout the County. For example, areas where groundwater supports wetland communities would be identified separately from areas where the groundwater-surface water interactions address community lakes or significant streams. Additional maps addressing shallow aquifer quality protection, shallow aquifer recharge, and other issues of public health and community development can be included after discussions with relevant community representatives.

The IWRG has submitted a New Program Request for FY09 to fund Task Two. The information from Task One is needed before the IWRG can work with the ISWS to define the scope of work for future water modeling for Lake County.